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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project	Date	Author

TITLE

FOREST INSECT SURVEY

SAN BERNARDINO FLOOD CONTROL DISTRICT - ZONE 5

Season of 1940

by
J. M. Miller
Berkeley, California
December 2, 1940

SUBJECT—

INDEX NO.—

U.S. GOVERNMENT PRINTING OFFICE 8—9742

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Forest Insect Laboratory
Berkeley, California
December 2, 1940

FOREST INSECT SURVEY

SAN BERNARDINO FLOOD CONTROL DISTRICT - ZONE 5

Season of 1940

SUBMITTED BY:

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FOREST INSECT SURVEY
SAN BERNARDINO FLOOD CONTROL DISTRICT - ZONE 5

Season of 1940

THE EFFECTS OF RECENT CONTROL WORK

For the current season of 1940, pine barkbeetle infestations reflect the beneficial effect of the control campaign carried out during the past winter by the Flood Control District and the San Bernardino National Forest.

A report submitted by the Forest Insect Laboratory under date of April 29, 1940, to members of the Flood Control Board and the Forest Service, summarized the technical accomplishments of this project. In brief, the following points were presented:

1. A total of 896 infested pine trees and poles were treated within the boundaries of the district by the combined efforts of the Flood Control organization and the San Bernardino National Forest. This work was completed during the period from January 1 to March 30, 1940. The trees treated represented the barkbeetle infestation carrying over from the active season of 1939 into the winter, and which threatened to continue aggressive activity into the 1940 season.

2. This project accomplished the eradication of a very high percent of the overwintering barkbeetle infestation. Very few infested trees were missed or were inadequately treated in the general coverage of the area.

3. As a result of the thoroughness of the eradication work it was expected that the number of trees killed during the 1940 season would be greatly reduced from that of 1939.

4. As a follow up to the control work it was suggested that individual lot owners be encouraged to use such practices in the cutting of green trees, disposal of slash, and treatment of trees infested during the summer season as would reduce the number of breeding places from which new centers of barkbeetle infestation could develop.

5. Recommendations were made that a forest insect survey of the district be made during the first part of November, 1940, as a basis for determining the need for further control work.

CONDITIONS FOUND IN THE SURVEY OF NOVEMBER, 1940

The fall survey of the District was made during the period from November 4 to 7 by Miller and Carlson of the Bureau of Entomology and Plant Quarantine. Part of this examination was made in the company of representatives of the Forest Service. Practically all of the district was brought under observation, and those units where control work was conducted last year were covered intensively by road strips.

The situation was found to be vastly improved from that of a year ago. In the survey made in November 1939, the number of trees killed in the entire district for the season was estimated at a total of 1485 trees and poles. For the season of 1940 the current estimate indicates a total of 250 trees and poles killed; a reduction of 85 percent from the loss of the preceding year.

By far the greater part of this reduction has taken place in the intensively used Crestline and Lake Arrowhead units where the 1939 losses were concentrated and where effective eradication work was carried out. The 1939 loss in these two units amounted to 1250 trees while the subsequent 1940 loss will apparently not exceed 60 trees - a reduction of 95 percent.

Character of the 1940 Infestations

In 1939 the aggressive infestation was composed of a combination of engraver beetles (Ips) and the western pine beetle which had developed into the aggressive epidemic which killed groups of trees. In 1940 there was found only a non-aggressive endemic infestation of the western pine beetle. The Ips type of infestation has largely disappeared from the area. The following are observations on conditions in the more important units.

Crestline: Some of the heaviest concentrations of the Ips - western pine beetle type occurred in this unit in 1939 with groups containing as many as 40 infested trees. This fall only the western pine beetle was found in trees scattered singly over the area. A slight concentration was found in the area west of Lake Gregory where one group of three small trees was found. In this part of the unit many trees are being weakened by an infestation of the California pine scale which will be described later in this report. Dying of some trees around the shore line of Lake Gregory is still continuing, probably as a result of water level changes since they were not attacked by primary insects. The total seasonal loss caused by insects on the entire unit was extimated at not to exceed 35 trees. Treatment of trees carrying over the overwintering infestation is recommended.

Lake Arrowhead: Conditions here are vastly improved over last year and no group kills at all were found. The residue of the barkbeetle infestation which has escaped the control work was found mainly on the poorer sites north of Lake Arrowhead. Only 10 trees killed during the season of 1940 were found during the survey and it was estimated that the late fading winter brood trees will not bring the total annual kill to more than 25 trees. Maintenance control is recommended, however, because of the high values in this unit. The average infested trees will be large.

Snow Valley: The actual conditions in this unit are difficult to appraise due to the dying of some trees from causes other than insects. Several trees were found which had died without an attack by primary insects as a result of root exposure where grading had been done for parking areas. The seasonal loss was estimated at 30 trees. There will probably be enough overwintering infestation to warrant maintenance control work in this unit.

Other Units: Other units in the district were covered by general reconnaissance. All the evidence indicates that there are no currently aggressive centers of infestation anywhere which would threaten the intensively used units mentioned above. Control work in the outlying areas would be warranted mainly to protect the more valuable tracts against invasion by epidemic infestations. Since no such threat exists at the present time, the control of outlying endemic infestations would cost more than the expected benefits could warrant.

CONTROL RECOMMENDATIONS

For the coming winter and spring period, barkbeetle control work becomes a problem of maintaining the present satisfactory conditions. If the small number of infested trees now in evidence are left untreated, they may find conditions favorable to a rapid increase of barkbeetle populations during the 1941 season. That is something dependent upon natural factors which cannot be forecast at the present time. Infestations may spring up again at any time if the critical factors favor the insects or harm the trees. Thus, in highly valuable recreational areas such as these ordinary precautions call for treatment of the existing infestation as insurance against much greater losses in another year or two. Maintenance control is recommended for the Crestline, Lake Arrowhead and Snow Valley Units because of their high values and intensive use.

Since the epidemic conditions and group killings of last year have been broken up, the control job now consists of locating and treating infested trees that are thinly scattered over these units. It is because of these conditions that the control costs per tree will be higher than last year. The number of overwintering infested trees can only be roughly estimated. Conditions at the time of this survey indicate that there will not be more than 50 on the Crestline and Arrowhead Units and no more than 20 in Snow Valley

Organization of Control Work

A small crew of two or three experienced men with transportation should be able to handle the work for the Crestline-Arrowhead areas. If this crew contains a qualified spotter, both the spotting and treatment can be combined in one operation, covering the area systematically by roads and treating the trees as they are located. This "flying crew" setup has been found satisfactory in working other maintenance control projects.

Infested trees will be found on both National Forest and private lands so that some cooperative understanding between the Flood Control District and the Federal Government is desirable in order to insure a unified program.

Timing of Control Work

In view of the small volume of work to be done, a long winter program will not be economical. It will be best to wait until the late winter and early spring period in order to pick up the late fading trees that are slow in showing symptoms of infestation. If timed in this way it should be possible to complete the project with one coverage of the area. The period best suited to the work is dependent upon weather conditions, but with normal winter temperatures and precipitation, the best time to start the work will be around the last of February or first of March. However, the work should be completed by the 15th of April as emergence of the winter broods of the western pine beetle can be expected soon after that date.

ANOTHER INSECT ATTACKING PINES IN THE DISTRICT

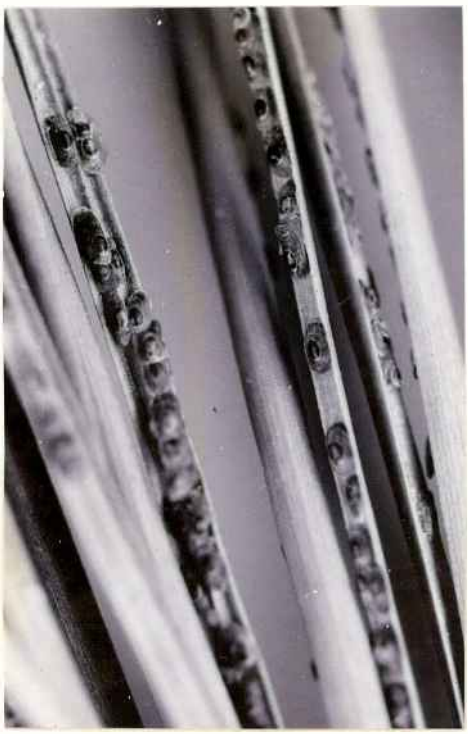
While barkbeetles have been the primary insect enemies of the pines up to the present, the probability of other insects injuring or killing these trees should not be overlooked. For the past few years a serious infestation of the California pine scale has been noted in the Crestline Unit. This is localized in an area covering roughly about 700 acres between Lake Gregory and Camp Seeley.

The attack of this scale species is upon the needles. When a tree becomes heavily infested for a few years the needles take on a sickly yellowish color, growth is suppressed, and the older needles fall prematurely. Eventually the tree takes on a thin-crowned defoliated appearance.

This is a native scale species and heavy infestations are usually reduced in a few years by natural agencies. However, if the trouble is prolonged the trees become very much weakened and susceptible to the attack of flathead borers and secondary cambium mining insects.

In some parts of the Crestline Units the scale has become so bad on trees that form the only cover for certain summer homes that they are suffering severely. Some trees have become badly stunted as a result of repeated defoliations. A spray control is the only method which could be used in combatting a scale infestation of this character, but spraying would be impracticable for general forest areas. However, it could be used on building sites to protect especially valuable individual trees. Experimental tests of spray formulae would be desirable if the infestation continues in order that owners may be advised as to the best spray to use in the protection of their more valuable trees.

The photographs attached to this report will show the character of the damage caused by the scale and how it can be recognized.



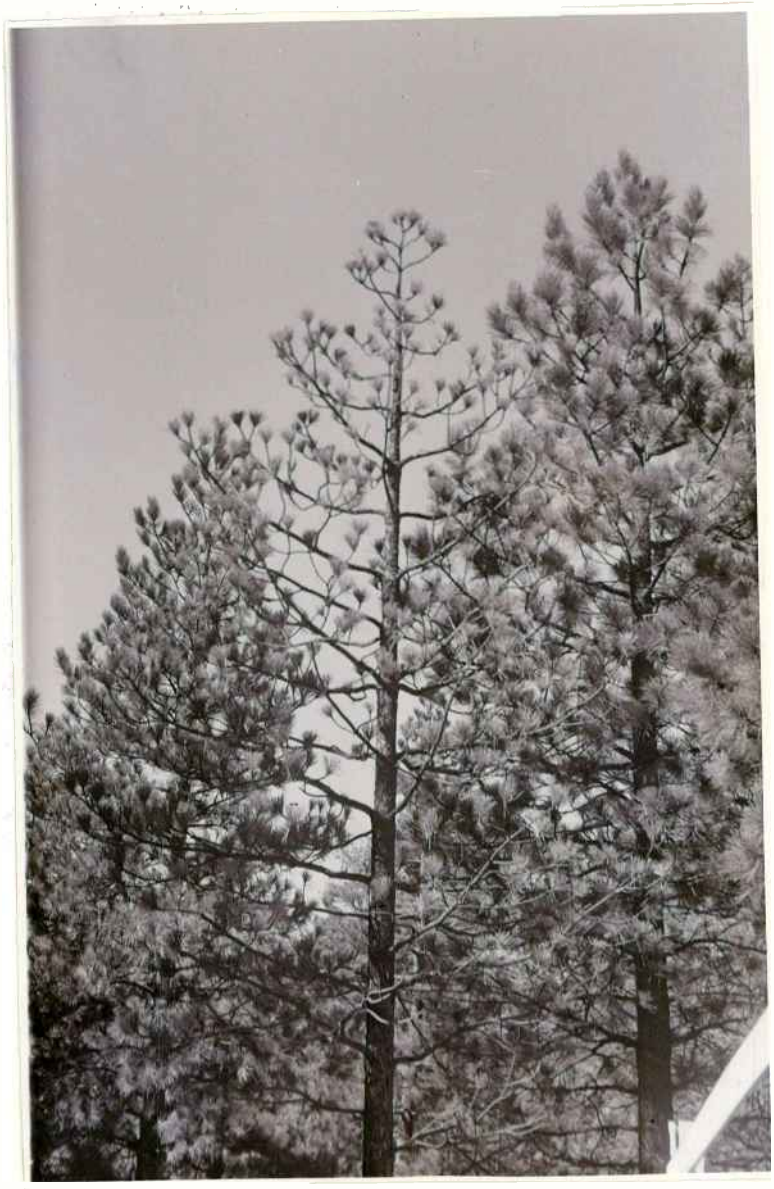
THE CALIFORNIA PINE SCALE,
NUCULASPIS CALIFORNICA COLM

RIGHT: PONDEROSA PINE FOLIAGE SHOWING HEAVY SCALE POPULATION ALONG THE NEEDLES

ABOVE: SCALE BODIES ON NEEDLES, ENLARGED ABOUT 8 TIMES.

LIFE HISTORY: THE SMALL BLACK BODIES SHOWN IN THESE PICTURES ARE THE ADULT FEMALE STAGE. THEY ARE COVERED WITH AN ARMORED SHELL UNDER WHICH THEY REMAIN DURING THEIR ENTIRE FEEDING PERIOD. UNDER EACH BODY IS A THREAD-LIKE MOUTHPART OR STYLET THAT EXTENDS DOWN INTO THE PLANT TISSUES AND WITH THIS THE INSECT SUCKS ITS FOOD FROM THE PLANT IN THE FORM OF NUTRIENT SOLUTIONS. EGGS ARE LAID BENEATH THE SHELL OF THE MOTHER SCALE. AFTER A SHORT INCUBATION PERIOD (DEPENDING IN LENGTH UPON CLIMATIC CONDITIONS) THE EGGS HATCH INTO MINUTE LARVAE THAT CRAWL OUT FROM BENEATH THE PARENT SCALE AND FIND FEEDING PLACES EITHER ON THE SAME NEEDLE OR ON NEW NEEDLES. FROM TWO TO THREE GENERATIONS ARE USUALLY PRODUCED ANNUALLY.

SCALES DO NOT FLY FROM TREE TO TREE AS BARKBEETLES DO, BUT SPREAD BY CRAWLING OR CHANCE DISTRIBUTION BY WINDS. FOR THIS REASON CERTAIN TREES WILL BE HEAVILY INFESTED WHILE A NEARBY TREE WILL BE FREE OF SCALES.



EFFECTS OF CALIFORNIA PINE SCALE ON PONDEROSA PINE IN THE CRESTLINE DISTRICT.

THE INFESTATION IS PREVALENT THROUGHOUT AN AREA OF ABOUT 700 ACRES WHERE MANY TREES ARE IN THE CONDITION SHOWN HERE.

THE CENTRAL TREE SHOWN IN PHOTOGRAPH TO THE RIGHT SHOWS THE EFFECTS OF SEVERAL YEARS OF FEEDING BY THE CALIFORNIA PINE SCALE. OLDER NEEDLES HAVE FALLEN AND THE NEEDLES OF THE CURRENT YEAR'S GROWTH HAVE BEEN STUNTED. IN COLOR THIS TREE WOULD HAVE A SLIGHTLY YELLOWISH APPEARANCE. THE TREE IMMEDIATELY TO THE RIGHT HAS NO HEAVY INFESTATION SO THAT ITS CROWN IS NORMAL WITH A FULL COMPLEMENT OF NEEDLES.

THE SMALL PHOTOGRAPH ABOVE SHOWS CLOSE UP OF STUNTED NEEDLE TUFTS. MOST OF THE OLDER NEEDLES HAVE FALLEN WHICH ACCOUNTS FOR THE THIN APPEARANCE OF THE ENTIRE CROWN.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT LABORATORY - BERKELEY, CALIFORNIA

1940

FOREST INSECT SURVEY

ARROWHEAD INFESTATION AREA

SAN BERNARDINO COUNTY, CALIFORNIA
SAN BERNARDINO MERIDIAN

SCALE
In 0 ½ 1 2 3 Miles

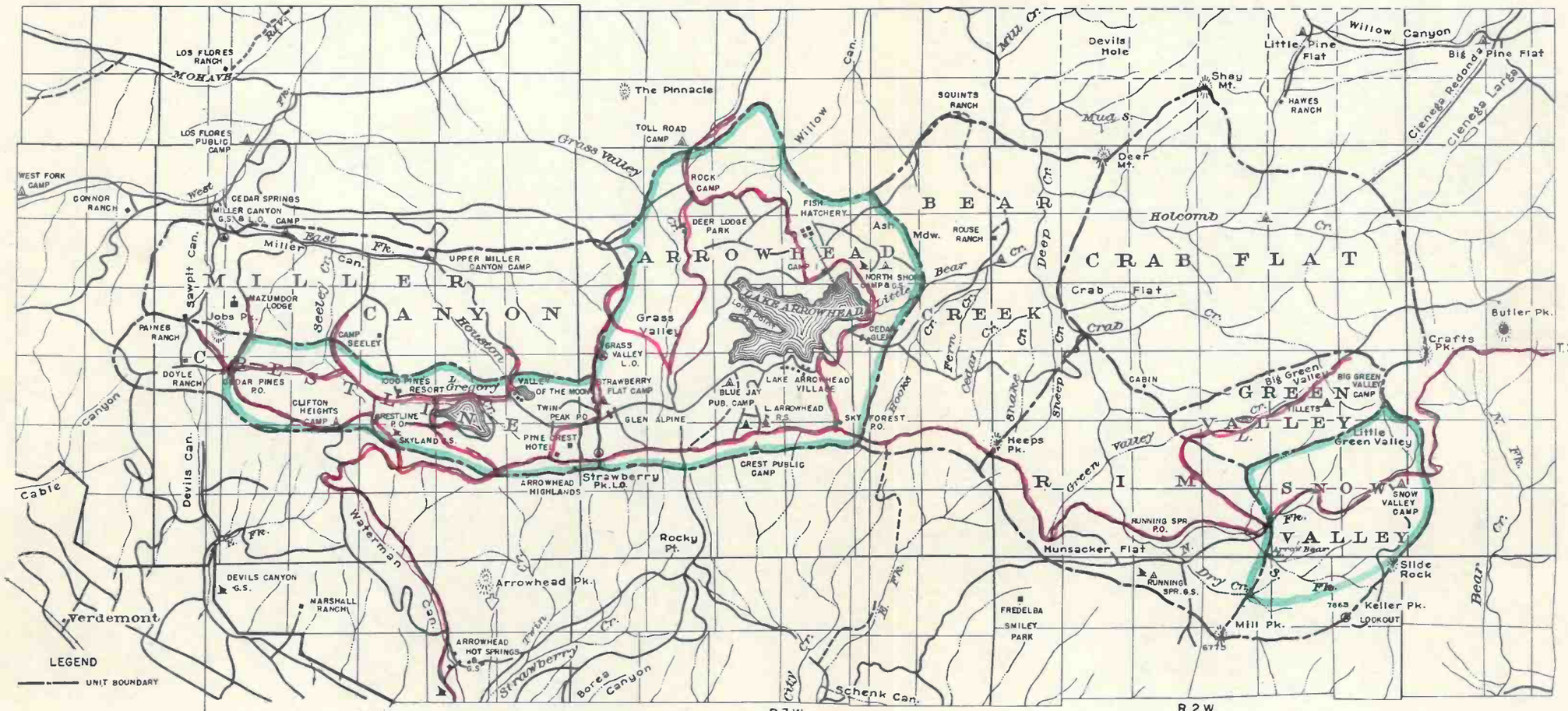
N

ROAD TRAVERSE.

BOUNDARY OF AREAS RECOMMENDED FOR MAINTENANCE CONTROL.

ESTIMATED UNIT LOSS - 1940

UNIT	NO. TREES
MILLER CANYON	25
CRESTLINE	35
ARROWHEAD	25
BEAR CREEK	20
CRAB FLAT	100
RIM	5
SNOW VALLEY	30
GREEN VALLEY	15
TOTAL	255



8/14/39